



RESEARCH ARTICLE.....

Fish trawl (119 M) of Ratnagiri, Maharashtra (India)

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ABSTRACT..... The present study deals with the design and technical aspects of high opening bottom fish trawl (119 m) locally know as 62 *Angali Disco Dol*, operated along the Ratnagiri coast of Maharashtra. The material used for the fish trawl is HDPE (High Density Polyethylene) and the knot type used for construction is a single trawl knot. Blue colour multifilament netting twine was normally used, having twine diameter of 1.50 mm for construction of netting of wing and Square section, 1.25 mm for belly; while 1.0 mm twine was used for part of belly, lengthener and cod end section. The mesh size of the wing and square section was 1200 mm and reduced down to the cod end section (18 mm). The net was specifically used to catch Ribbonfish, Squid, Croaker, Pomfret etc. at a depth of 20 to 40 fathoms.

KEY WORDS..... Trawling, High opening fish trawl, 62 *Angali disco dol*

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INTRODUCTION.....

Trawling, though an efficient method of fishing is known to be one of the most non-selective methods of fish capture. Trawl is an important marine fishing gear; nearly 20 per cent of marine fish landed in the world is caught by this gear (Sreekrishna and Shenoy, 2001). The major factors influencing on the fish catch is the vertical opening of the net (Takayama and Koyam, 1959 and Parrish, 1959). In a known fishing ground the quantity of fish caught by trawl gear has direct bearing on the volume of water filtered during a certain period of operation and depends on both the horizontal and vertical opening of the net while in operation (Deshpande, 1960).

The trawl nets are operated from Ratnagiri as per the prevailing local practices largely based on the individual fishing experience (Mohite, 1999). The nets

are fabricated as per the requirement of individual fisherman and local tradition. Thus variations in design pattern and rigging practices of trawl nets are observed. Therefore, the present study is an attempt to document the observation with respect to net design, specifications, material used, mesh size, mode of operation, etc of the high opening bottom fish trawl (119 m) operated along the Ratnagiri coast of Maharashtra.

RESEARCH METHODS.....

The detailed information regarding the technical specifications of high opening bottom fish trawl (119 m) operated along the Ratnagiri coast of Maharashtra was collected by physically sampling the units in operation. Structured interview schedule comprising of two major sections was formulated to collect data required for the

present study. The first section dealt with the particulars of the trawl owners / trawlers and second for the detail specifications of the trawl net operated. The collected data was recorded according to Sreekrishna and Shenoy (2001) and Akerman (1986) and statistically analyzed as required (Snedecor and Cochran, 1967). The designs of the gear were documented according to Nedelec (1975).

RESEARCH FINDINGS AND ANALYSIS.....

The high opening bottom fish trawl (119 m) operated along the Ratnagiri coast of Maharashtra is commonly known as 62 *Angli disco dol*. The number of *Angli* locally refers to the width of the mesh size equivalent of that many numbers of fingers. Different sections are fabricated separately and then assembled as per the

specifications. Fish Trawl (62 *Angli disco dol*) was a two seam high opening bottom trawl net operated along the coast of Ratnagiri specifically used to catch Ribbonfish, Squid, Croaker, Pomfret etc. It had two panels *i.e.* upper and lower panel, while the side panels were absent. The average total length of the 62 *Angli disco dol* was found to be 119 m and the belly portion had mesh size of 1200 mm. The detailed technical specifications of Fish Trawl (62 *Angli disco dol*) net are presented in the Table 1. The relationship between various parts of the fish trawl are presented in Table 2, 3 and 4. The design of the net is depicted in Fig. 1.

In the fish trawl (62 *Angli disco dol*), head rope (119 m) and foot rope (128 m) of 10 mm diameter made up of HDPE was used. Hollow spherical shaped HDPE

Table 1 : Technical specifications of (119 M) high opening bottom fish trawl (62 *Angli disco dol*)

Name of the gear: <i>Disco dol</i>			Main species caught : Ribbonfish, Squid, Croaker, Pomfret etc.				Operation : Day			Trawling speed :10-12 RPM			Vessel : OAL : 40- 50 feet		
Locality: Ratnagiri, Maharashtra India							Trawling period : 4 Hrs		Water depth to warp ratio :1: 25			B.H.P : 90-165			
Particulars of webbing															
Webbing	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Sections/ Local name	Wing/ <i>Paay</i>		Square/ <i>Pat</i>	Belly/ <i>Ghanpat</i>											Codend/ <i>Khola</i>
Material/ preservation	High Density Polyethylene (HDPE)/ Nil														
Knot type/ colour	Single Trawl Knot/ Blue/ Green														
Twine Ø mm	1.50				1.25						1				
Mesh size, mm	1200	1200	1200	1000	800	600	320	200	120	80	60	40	30	25	18
Upper edge, m	30	30	150	150	150	150	180	180	180	180	250	200	100	100	100
Lower edge, m	30	30	150	150	150	150	180	180	180	180	200	100	100	100	100
Depth, meshes	30/35	30/35	15/8	6	6	6	8	12	25	50	50	100	150	150	150
Baiting / creasing rate					-						2:1		2:1		-
Hanging co-efficient	0.56/0.55								-						
Particulars of lines and ropes															
	Top wing section				Bottom wing section				Wing end section				Lateral sides		
	Bolsh rope		Head rope		Bolsh rope		Foot rope		Wing line				Side rope		
Material	NA		HDPE		NA		HDPE		HDPE				HDPE		
Number			1				1		2, One on either end				2, One on either side		
Diameter, mm			10				10		5				4		
Length, m			119				128		29				73 x 2		
Particulars of other gear accessories															
	Floats								Sinkers				Otter boards		
Diameter, mm	152, 203,254,305								6-8						
Number/quantity	5-7								500-600				2		
Material	PVC								Iron				Wooden planks fitted with iron plates and iron shoe		
Shape	Round								Ellipse ring				Flat Rectangular		
Indicator float	-								-				1524 x 1067 x 31.75 at top and 63.5 at bottom		
Style of attachment/ dimension, mm	2+1+2 3+1+2								Each loop consists of 17 ellipse rings. Each loop is attached with a gap of 4-5 feet interval				(Length x Breadth x Width)		
Weight in air, kg	0.250, 0.500, 1.5,2								30-35				75		

behind the cabin and a four drum power take off winch. Commercial and Palghar type winches which are perpendicular type of winches, are fitted on front side of cabin having two net drums and warping heads are used.

The crew members in each fishing vessel for trawling operation ranges from 5 to 8. Trip duration ranges from single day operations to multiday; with actual trawling operation carried out for 12–18 hrs per day. The stern based trawling is generally of 3–4 hours per haul with the trawler speed being maintained at 4–6 knots.

During the present investigation, it was observed that generally small, medium, large sized ribbonfish, mostly belonging to *T. lepturus*, were caught in fish trawls/*Disco* nets. Considerably high yields of ribbonfish in HOBTs have been reported by Kunjipalu (1980); Kunjipalu *et al.* (1984, 1990 and 1992); Antony Raja (1987) and Kulkarni and Sharangdher (1990). The rope trawl, which has been proved to be quite effective in capturing Ribbonfish, Silver bellies, Anchovies, Sciaenid's, Pomfret, Cephalopods etc. (Rao, 1994 and Rao and Narayanappa, 1994) is yet to be adopted on commercial scale by the fishermen of Ratnagiri. While small, medium and large sized Ribbonfish, comprising mostly *T. lepturus* are readily purchased by the agents of the fish processing factories on the landing centre itself.

During the present study, it was observed that duration of single trip was 12–18 hrs a day. Speed of the trawler was maintained at 1200 rpm for cruising and 1000 rpm for trawling operation. On the comparative efficiency of conventional and bulged belly fish trawls was studied by Varghese *et al.* (1968). In their study, they made net with bulged belly and compared with a conventional design under actual fishing conditions. Pillai *et al.* (1978) analyzed three different concepts of trawl designs and concluded that bulged belly trawl is more suitable for fishing prawns and high opening trawls can be operated for capturing fishes. Design aspects of 12.77

m two seam improved trawl was described by Vijayan *et al.* (1990) in Valappu area of Vypeen Island. Advantage of large meshes in 10.3 m mid water trawl was studied by Vijayan (2009) by representing its design and specification. Comparative study on design and fishing efficiency of large meshed four seam trawl and high opening bottom two seam trawl off Mangalore was conducted by Nayak and Sheshappa (1993). In Ratnagiri, it was seen that for catching fish *Disco dol* a two seam fish trawl net without side panels, was commonly used.

Rao and Narayanappa (1994) studied performance of 25 m rope trawl in inshore waters off Kakinada, Andhra Pradesh and design detail was described. The design and construction aspect of the *Disco dol* was studied during the present research work. Similarly, design features of fish trawls of Thoothukkudi coast was studied by Neethiselvan and Brucelee (2003). The design details, rigging and functional characteristics of semi-pelagic trawl were studied by Vijayan *et al.* (2003 a & b). Design and operational efficiency of mini trawl net for capturing demersal fishes and prawns in Netravati-Gurpur estuary at Manglore has been described by Sheshappa (1978), in Kasargod district by Remesan and Ramachandran (2005) and off Cochin by Boopendranath and Hameed (2013). Design and technical specifications of demersal trawl used in the Turkish coast of the Aegean Sea was presented by Tosunoglu and Aydin (2007).

Disco dol net costs around Rs. 20,000/- to 30,000/-. The nets are generally fabricated by local net braiders. No standard designs or specifications are followed while fabricating them, which largely depend on individual experience, local practices, and demands of owner coupled with new trends or designs in vogue etc.

Conclusion :

The documented information on the technical

Table 3 : Relationship of stretched length of upper edge of belly with the length along various parts of trawl (Sreekrishna and Shenoy, 2001)

Sr. No.	Type of trawl	Stretched length of upper edge of belly (m)	Length of webbing for bosum (m)	Height of webbing for jibs (m)	Width of webbing for jibs (m)	Depth of webbing for belly (m)	Width of lower part of belly (m)	Length of cod end (m)
1.	62 Angli disco dol	180	60	60	30	135	45	63 to 81

Table 4 : Relationship between maximum belly width and head rope length

Sr. No.	Type of trawl net	Length of head rope recorded	Mesh size of belly (mm)	Maximum no. of meshes in belly	Stretched belly width (m)	Estimated Stretched belly width (Kartha <i>et al.</i> , 1990)
1.	62 Angli disco dol	119	1,200	150	180	85.6868

specifications and operation of high opening bottom fish trawl (119 m) or 62 *Angali disco dol* net of Ratnagiri, would serve as a base line information for the technological modifications the net may undergo to increase its efficiency in the coming years.

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LITERATURE CITED.....

- Akerman, S.E.** (1986). The coastal set bag net fishery of Bangladesh trials and investigations Bay of Bengal program, BOBP/REP/34 (FAO), GCP/RAS/040/AWS, 1–25.
- Antony Raja, B.T.** (1987). High-opening bottom trawling in Tamil Nadu, Gujarat and Orissa, India: A summary of effort and impact. FAO Bay of Bengal Programme, BOBP/REP/37.
- Boopendranath, M.R.** and Hameed, M.S. (2013). Energy analysis of mini-trawl operations, off Cochin, Kerala, India. *Fishery Technol.*, **50** : 289–293.
- Deshpande, S.D.** (1960). On the comparative catch efficiency of hand operated and winch operated trawls. *Indian J. Fisheries*. **7**: 458-470.
- Kartha, K.N.**, Kuttappan, A., Varghese, M.D., George, V.C., Rama Rao, S.V.S. and Krishna Iyer, H. (1990). Design aspects of double rig shrimp trawls operate off ishakhapatnam. *Fishery Technol.*, **27**: 92-97.
- Kulkarni, G.N.** and Sharangdher, S.T. (1990). Disco net fishing off Ratnagiri coast. *Fish. Chimes*, 1990: 37–41.
- Kunjipalu, K.K.** (1980). Ribbon Fishes – A new Trawl resource of Veraval. Paper presented at the Seminar on 'Recent trends in teaching and research in Aquatic Biology' Bhavanagar, 26–28.
- Kunjipalu, K.K.**, Boopendranath, M. R., Gopalakrishnan, K. and Kuttappan, A.C. (1984). A new high opening trawl for Veraval Waters. *Fishery Technol.*, **21**: 86-90.
- Kunjipalu, K.K.**, Pillai, N. S. and Boopendranath, M. R. (1990). Performance of high opening trawls off veraval, North West Coast of India. *Fishery Technol.*, **27**: 1–4.
- Mohite, A.S.** (1999). Stock assessment of *Trichiurus lepturus* (Linnaeus, 1758) and Study of gears employed in its fishery of Maharashtra coast. Ph. D. Thesis, Central Institute of Fisheries Education, Mumbai. 129 pp.
- Nayak, B.B.** and Sheshappa, D.S. (1993). Effect of large meshes on the body of trawl net in energy conservation. *Fishery Technol.*, **30** : 1-5.
- Nedelec, C.** (1975). FAO Catalogue of small scale fishing gear. Fishing News (books) Ltd., Farnham, Surrey, England.
- Neethiselvan, N.** and Brucelee, G. (2003). Analysis of design features of fish trawls and shrimp trawls of Thoothukkudi coast. *Fishery Technol.*, **40** (1) : 18-23.
- Parrish, B.B.** (1959). Discussion on relative efficiency of nets made of different materials. In: *Fishing gear of the world*. H. Kristijonsson (Ed). Fishing News (Books) Ltd., London: 164-165.
- Pillai, N.S.**, Vijayan, V., Hridayanathan, C. and Manoharadoss, R.S. (1978). *Evolution of suitable trawl nets for medium size trawlers*. I-Comparative fishing efficiency between 32m Bulged Belly, Long Wing and Four Panel trawls. *Fishery Technol.*, **15** : 71-75.
- Rao, S.V.S.** (1994). Performance of rope trawl in deep waters off North West Coast of India. *Fishery Technol.*, **31** (2) : 127–132.
- Rao, S.V.S.** and Narayanappa, G. (1994). Performance of 25 m Rope Trawl in Inshore Waters. *Fishery Technol.*, **31** (2) : 118 – 121.

- Remesan, M.P.** and Ramchandran, A. (2005). Mini-trawls for Estuarine Fishing in Kasargod District. *Fishery Technol.*, **42** (1) : 41-46.
- Sheshappa, D.S.** (1978). The Design and operational efficiency of a mini trawl net for capturing demersal fishes and prawns in estuaries. *Mysore J. Agric. Sci.*, **12** : 618-621.
- Snedecor, G.W.** and Cochran, W.G. (1967). *Statistical methods*, 6th Ed., Oxford and IBH Publishing Co., New Delhi: 593 p,
- Sreekrishna, Y.** and Shenoy, L. (2001). Fishing gear and craft technology Directorate of Information and Publications of Agriculture Indian Council of Agricultural research Krishi Anusandhan Bhavan, New Delhi, 342 pp.
- Takayama, S.** and Koyama, T. (1959). Increasing the opening height of a trawl net by means of a kite. In: *Modern Fishing Gear of the World*, Kristjonsson, H. (Ed), Fishing News (Books) Ltd., London, 1: 185-195.
- Tosunoglu, Z.** and Aydin, C. (2007). Technical characteristics of demersal trawl nets recently used in the Turkish coast of the Aegean Sea. *J. Fisheries Sci.*, **1** (4) : 184-187.
- Varghese, C.P.**, Vijayan, V. and Kuriyan, G.K. (1968). On the comparative efficiency of conventional and bulged belly fish trawls. *Fishery Technol.*, **5** (1) : 9-14.
- Vijayan, V.**, Varghese, M.D., George, V.C. and Unnithan, G.R. (1990). Evolution of an Improved Trawl for Traditional Motorised Craft. *Fishery Technol.*, **27** : 1-4.
- Vijayan, V.**, Dawson, P., Varghese, M.D. and Mathai, P.G. (2003a). Operational efficiency of suberkub and polyvalent otter boards for target-specific inshore semipelagic trawling. *Fish. Technol.*, **40** (1) : 28-30.
- Vijayan, V.**, Manoharadoss, R.S. and Cubelio, S.S. (2003b). Target-specific 51.0 m long-wing semi-pelagic trawl for effective off-bottom fishing in India EEZ, *Fish. Technol.*, **40** (1) : 24-27.
- Vijayan, V.** (2009). Midwater trawls and their operation, In : Handbook of Fishing Technology (Meenakumari, B., Boopendranath, M.R., Pravin, P., Thomas, S.N. and Edwin, L., Eds.), Chapter 9, p. 165-176. Central Institute of Fisheries Technology, Cochin

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